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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,056	03/31/2004	Evan C. Lec	SVL920030114US1	7939
27885	7590	02/23/2007		
FAY SHARPE LLP 1100 SUPERIOR AVENUE, SEVENTH FLOOR CLEVELAND, OH 44114			EXAMINER ADAMS, CHARLES D	
			ART UNIT	PAPER NUMBER
			2164	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/815,056	Applicant(s) LEE, EVAN C.	
	Examiner Charles D. Adams	Art Unit 2164	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3-31-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

IDS

1. The reference US Patent 6,067,452, published on May 23rd 2000, was invented by Alexander, Roger K., not Carino, JR. as listed. As such, this reference was not considered.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-18 are directed to the creation of a fragmented database. The claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring article / phenomenon) since it fails to produce a useful and tangible result.

The claims lack a tangible result because the claimed subject matter fails to produce a result that is limited to having a real world value rather than a result that may be interpreted to be abstract in nature as, for example, a thought, a computation, or manipulated data. The claims lack a useful result because there is no claimed utility of the subject matter of the claims. In claims 1-13, though a database query is being processed against the database fragments, nothing is being done with this processing. There is neither a useful or tangible result of this processing. The fragmented database of

Art Unit: 2164

claims 14-18 also lack a useful and tangible result because nothing is being done with the claimed fragmented database.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 14-16, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Zait et al. (US Patent 6,665,684).

As to claim 1, Zait et al. teaches fragmenting a database into a plurality of database fragments using a plurality of fragmentation expressions, each fragmentation expression corresponding to a database fragment and including a Boolean combination of one or more comparison-predicates wherein each comparison-predicate defines a range of fragmentation dimension basis function of one or more database fields (see Zait et al. 1:38-67); and

Processing a database query against the database fragments of the database (see Zait et al. 1:38-67).

As to claim 2, Zait et al. teaches:

Resolving a data selection expression of the database query into a Boolean combination of fragment selection comparison-predicates wherein each fragment selection comparison-predicate defines a range of one of the fragmentation dimension basis functions (see Zait et al. 2:17-40. The two comparison elements (94-04-01) and (94-06-15) are Boolean combinations in that only elements that occur within those key values are selected. They are used to define what partition ranges should be queried. In this case, it is determined to query "sal94Q2");

Identifying one or more eliminated database fragments based on the Boolean combination of fragment selection comparison-predicates and the fragmentation scheme (see Zait et al. 2:17-33); and

Processing the database query against database fragments other than the eliminated database fragments (see Zait et al. 2:17-33).

As to claim 14, Zait et al. teaches:

A fragmentation scheme including:

(i) one or more fragmentation dimension basis functions wherein each fragmentation dimension basis function depends upon one or more database fields (see 1:45-67), and

(ii) a plurality of fragmentation expressions, each fragmentation expression being defined by a Boolean combination of comparison-predicates wherein each comparison-

predicate defines a range of one of the fragmentation dimension basis functions (see 1:45-67); and

a plurality of database fragments, each database fragment containing data satisfying a corresponding one of the plurality of fragmentation expressions (see 1:45-67).

As to claim 15, Zait et al. teaches:

A query processor performing a method including (i) receiving a database query and (ii) processing the database query against the plurality of database fragments (see 2:17-40); and

A fragment elimination processor performing a method including:

(i) resolving a data selection expression of the database query into a Boolean combination of fragment selection comparison-predicates wherein each fragment selection comparison-predicate defines a range of one of the fragmentation basis functions (see Zait et al. 2:17-40. The two comparison elements (94-04-01) and (94-06-15) are Boolean combinations in that only elements that occur within those key values are selected. They are used to define what partition ranges should be queried. In this case, it is determined to query "sal94Q2"), and

(ii) eliminating one or more of the plurality of database fragments from the processing of the database query by the query processor, the eliminating being based on comparison of the boolean combination of fragment selection

Art Unit: 2164

comparison-predicates with the fragmentation expressions (see Zait et al. 2:17-40).

As to claim 16, Zait et al. teaches wherein the one or more fragmentation dimension basis functions comprise:

A first fragmentation dimension basis function depending upon at least a first database field (see 1:45-67); and

A second fragmentation dimension basis function depending upon at least the first database field (see 1:45-67).

As to claim 18, Zait et al. teaches wherein the one or more fragmentation dimension basis functions comprise:

A fragmentation dimension basis function that includes an extraction operator (see 1:45-67. Rows are extracted from the data and split into the different partitions).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-6, 8-9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait et al. (US Patent 6,665,684) in view of Jakobsson et al. (US Patent 6,965,891).

As to claim 3, Zait et al. teaches wherein the resolving of the data selection into a Boolean combination of fragment selection comparison-predicates comprises:

Identifying a comparison-predicate of the data selection expression, the comparison-predicate including a comparison operator comparing a constant value with a candidate function that depends upon one or more database fields (see Zait et al. 2:17-40); and

Zait et al. does not teach converting the identified comparison-predicate into one or more of the fragment selection comparison-predicates.

Jakobsson et al. teaches converting the identified comparison-predicate into one or more of the fragment selection comparison-predicates (see 8:31-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zait et al. in view of Jakobsson et al., since Jakobsson et al. teaches that "smaller objects are often easier to manage and more efficient to search than larger objects. Thus, database systems utilize partitioning to decompose objects such as tables and indexes into smaller and more manageable pieces or "partitions"" (see 1:10-14).

As to claim 4, Zait et al. as modified teaches wherein the converting comprises:

identifying the selected candidate function as equivalent to one of the fragmentation dimension basis functions (see Jakobsson et al. 8:31-64).

As to claim 5, Zait et al. as modified teaches wherein the converting comprises: applying a monotonic transform to the candidate function and to the constant value of a identified comparison-predicate, the application of the monotonic transform converting the candidate function into one of the fragmentation dimension basis functions (see Jakobsson et al. 8:31-64. Monotonic transformations preserve the order of a function. In this case, the converted function still has the same order, as it is still simply querying the memory partition).

As to claim 6, Zait et al. as modified teaches wherein the applying of a monotonic transform comprises:

Applying an extraction function to the candidate function and to the constant value of the identified comparison-predicate (see Jakobsson et al. 8:31-64. The candidate function product.product_category='MEMORY' is extracted from the original query, as it is reused in the converted query).

As to claim 8, Zait et al. as modified teaches wherein the candidate function of the identified comparison-predicate is an extraction of one of the fragmentation dimension basis functions (see Jakobsson et al. 8:31-64), and the applying of a monotonic transform comprises:

Substituting the fragmentation dimension basis function for the candidate function of the identified comparison-predicate (see Zait et al 2:17-40 and Jakobsson et al. 8:31-64);

Substituting a new value for the constant value of the identified comparison-predicate, the extraction applied to the new value producing the constant value (see Zait et al 2:17-40 and Jakobsson et al. 8:31-64).

As to claim 9, Zeit et al. as modified teaches wherein the applying of a monotonic transform includes:

Applying a monotonic transform that changes granularity (see Jakobsson et al. 11:14-12:23); and

Selecting an endpoint of a range of the transformed identified comparison-predicate to ensure that the range of the transformed identified comparison-predicate includes the entire range of the identified comparison-predicate (see Zait et al. 2:17-34. The comparison predicate is compared to the fragments to determine what fragment to query against. The fragments have endpoints, so choosing a fragment selects an endpoint).

As to claim 11, Zait et al. as modified teaches wherein the converting of the identified comparison-predicate into one or more of the fragment selection comparison-predicates includes:

converting the identified comparison-predicate into a fragment selection

comparison-predicate having a range that (i) is larger than the range of the identified comparison-predicate and (ii) includes the range of the identified comparison-predicate (see Zait et al. 2:17-34. The comparison is converted to querying the entire partition, which is larger than the current query, and includes the range of the current query).

As to claim 12, Zait et al. as modified teaches wherein the converting of the identified comparison-predicate into one or more of the fragment selection comparison-predicates includes:

Converting the identified comparison-predicate into a fragment selection comparison-predicate having a smaller granularity than the identified comparison-predicate, an endpoint of the range defined by the fragment selection comparison-predicate being selected to include the entire range of the identified comparison-predicate (see Jakobsson et al. 8:31-64 and Zait et al. 2:17-34).

8. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait et al. (US Patent 6,665,684) in view of Jakobsson et al. (US Patent 6,906,891), and further in view of Antoshenkov (US Patent 5,664,172).

As to claim 7, Zait et al. as modified teaches wherein applying the extraction function increases granularity (see Jakobsson et al. 11:14-12:23)

Zait et al. does not teach wherein the comparison operator of the identified comparison-predicate is an exclusive comparison operator

Antoshenkov teaches wherein the comparison operator of the identified comparison-predicate is an exclusive comparison operator (see Antoshenkov 8:41-64), and the converting further comprises:

Replacing the exclusive comparison operator with an inclusive comparison operator (see Antoshenkov 8:41-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified Zait et al. by the teaching of Antoshenkov, since Antoshenkov teaches that “the invention determines the near-largest interval for which the selection criteria is always false and avoids scanning the corresponding portion of the database. Also, within any interval of values for which the selection criteria is always true, evaluation of the records is not necessary, since the records satisfy the selection criteria” (2:66-3:5).

As to claim 10, Zait et al. as modified teaches the method as set forth in claim 5.

Zait et al. as modified does not teach applying a monotonically decreasing transform to the candidate function and to the constant value of the identified comparison predicate;

Antoshenkov teaches applying a monotonically decreasing transform to the candidate function and to the constant value of the identified comparison predicate (see Antoshenkov 8:41-64); and

Zait et al. as modified teaches reversing a directionality of the comparison operator of the identified comparison-predicate (see Antoshenkov 8:41-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified Zait et al. by the teaching of Antoshenkov, since Antoshenkov teaches that "the invention determines the near-largest interval for which the selection criteria is always false and avoids scanning the corresponding portion of the database. Also, within any interval of values for which the selection criteria is always true, evaluation of the records is not necessary, since the records satisfy the selection criteria" (2:66-3:5).

9. Claims 13, 17, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zait et al. (US Patent 6,665,684) in view of Hallmark et al. (US Patent 6,014,656).

As to claim 13, Zait et al. teaches the method of claim 1.

Zait et al. does not teach recognizing the query as a row insert or row update operation including a plurality of new record fields corresponding to database fields of the database;

Hallmark et al. teaches recognizing the query as a row insert or row update operation including a plurality of new record fields corresponding to database fields of the database (see 12:33-42);

Zait et al. as modified teaches computing fragmentation dimension values corresponding to the fragmentation dimension basis functions using the new record fields as inputs (see 12:33-42);

Inserting or updating using the new record fields in an identified one of the database fragments whose corresponding fragmentation expression is satisfied by the computer fragmentation dimension values (see 12:33-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zait et al. in view of Hallmark et al., since Hallmark et al. teaches that "dividing a table into partitions allows query execution time to be reduced by removing from consideration those partitions that cannot possibly contain rows that satisfy specified query conditions" (see Hallmark et al. 4:55-58).

As to claim 17, Zait et al. teaches the fragmented database as set forth in claim 14.

Zait et al. does not teach a fragmentation dimension basis function that depends upon at least two database fields.

Hallmark et al. teaches a fragmentation dimension basis function that depends upon at least two database fields (see 5:5-35 and Figure 3. The shipDate depends on the receiveDate in that the shipDate cannot be more than 3 months before the receiveDate).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zait et al. in view of Hallmark et al., since Hallmark et al. teaches that "dividing a table into partitions allows query execution time to be reduced by removing from consideration those partitions that cannot possibly contain rows that satisfy specified query conditions" (see Hallmark et al. 4:55-58).

As to claim 19, Zait et al. teaches:

Program code for constructing a fragmented database having a fragmentation scheme constructed using fragmentation dimension basis functions, each fragmentation dimension basis function depending upon at least one database field (see 1:44-67); and

Zait et al. does not teach program code for inserting a new record into the fragmented database, the inserting including (i) computing values of the fragmentation dimension basis functions using fields of the new record, (ii) selecting a target database fragment based on the fragmentation scheme and the computer values of the fragmentation dimension basis functions, and (iii) inserting the new record into the target database fragment.

Hallmark et al. teaches program code for inserting a new record into the fragmented database, the inserting including (i) computing values of the fragmentation dimension basis functions using fields of the new record, (ii) selecting a target database fragment based on the fragmentation scheme and the computer values of the fragmentation dimension basis functions, and (iii) inserting the new record into the target database fragment (see 12:33-42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zait et al. in view of Hallmark et al., since Hallmark et al. teaches that "dividing a table into partitions allows query execution time to be reduced by removing from consideration those partitions that cannot possibly contain rows that satisfy specified query conditions" (see Hallmark et al. 4:55-58).

As to claim 20, Zait et al. as modified teaches:

Program code for performing a database query, the performing including

(i) resolving a data selection expression of the database query into one or more one-dimensional expressions each dimensioned by one of the fragmentation dimension basis functions (see Hallmark et al. 9:63-10:61),

(ii) identifying at least one eliminated database fragment based on the one or more one-dimensional expressions and the fragmentation scheme (see Hallmark et al. 10:58-10:61), and

(iii) processing the database query against the database fragments other than the at least one eliminated database fragment (see Hallmark et al. 10:58-10:61).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles D. Adams whose telephone number is (571) 272-3938. The examiner can normally be reached on 8:30 AM - 5:00 PM, M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Rones can be reached on (571) 272-4085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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